

What is claimed is:

1. A tubular apparatus insertable within the body, comprising:
 - a tubular member having a proximal section, a distal section, and a lumen therethrough;
 - a first inflatable member coupled to the distal section of the tubular member, said first inflatable member being in fluid communication with a first fluid source;
 - a second inflatable member coupled to the distal section of the tubular member, said second inflatable member being in fluid communication with a second fluid source containing an acoustically transmissive material; and
 - an extracorporeal ultrasound unit for ultrasonically placing and monitoring the tubular apparatus within the body.
2. The tubular apparatus of claim 1, wherein the distal section of said tubular member includes a beveled tip.
3. The tubular apparatus of claim 1, wherein the tubular member has a curved shape.
4. The tubular apparatus of claim 1, further comprising an opening disposed through the wall of the tubular member.
5. The tubular apparatus of claim 4, wherein said opening is located between the first and second inflatable members.

6. The tubular apparatus of claim 1, further comprising a ventilation hub connected to the proximal section of said tubular member, said ventilation hub being in fluid communication with the ventilation lumen and an external ventilation unit.

7. The tubular apparatus of claim 1, wherein the second inflatable member is coupled to the tubular member at a location distal to the first inflatable member.

8. The tubular apparatus of claim 1, wherein the first inflatable member is configured to radially expand in a symmetrical manner about the tubular member.

9. The tubular apparatus of claim 1, wherein the second inflatable member is configured to expand in an asymmetrical manner about the tubular member.

10. The tubular apparatus of claim 1, wherein the second inflatable member is configured to expand in a symmetrical manner about the tubular member.

11. The tubular apparatus of claim 1, wherein the acoustically transmissive material comprises a balanced saline solution.

12. The tubular apparatus of claim 1, wherein the ultrasound unit includes at least one ultrasonic transducer.

13. The tubular apparatus of claim 12, further comprising an ultrasonic monitor capable of ultrasonically imaging the second inflatable member within the body.

14. The tubular apparatus of claim 13, wherein said ultrasonic monitor is adapted to ultrasonically image fluid flow within the second inflatable member using Doppler imaging.

15. The tubular apparatus of claim 1, wherein said tubular member is an endotracheal tube.

16. An endotracheal tubular apparatus insertable within the body, comprising:
a tubular member having a proximal section, a distal section, and a ventilation lumen therethrough;

a first inflatable member coupled to the distal section of the tubular member, said first inflatable member being in fluid communication with a first fluid source;

a second inflatable member coupled to the distal section of the tubular member, said second inflatable member being in fluid communication with a second fluid source containing an acoustically transmissive material; and

an extracorporeal ultrasound unit for ultrasonically placing and monitoring the tubular apparatus within the body.

17. The endotracheal tubular apparatus of claim 16, wherein the distal section of said tubular member includes a beveled tip.

18. The endotracheal tubular apparatus of claim 16, wherein the tubular member has a curved shape.

19. The endotracheal tubular apparatus of claim 16, further comprising a Murphy eye disposed through the wall of the tubular member.

20. The endotracheal tubular apparatus of claim 19, wherein said Murphy eye is located between the first and second inflatable members.

21. The endotracheal tubular apparatus of claim 16, further comprising a ventilation hub connected to the proximal section of the tubular member, said ventilation hub being in fluid communication with the ventilation lumen and an external ventilation unit.

22. The endotracheal tubular apparatus of claim 16, wherein the second inflatable member is coupled to the tubular member at a location distal to the first inflatable member.

23. The endotracheal tubular apparatus of claim 16, wherein the first inflatable member is configured to radially expand in a symmetrical manner about the tubular member.

24. The endotracheal tubular apparatus of claim 16, wherein the second inflatable member is configured to expand in an asymmetrical manner about the tubular member.

25. The endotracheal tubular apparatus of claim 16, wherein the second inflatable member is configured to expand in a symmetrical manner about the tubular member.

26. The endotracheal tubular apparatus of claim 16, wherein the acoustically transmissive material comprises a balanced saline solution.

27. The endotracheal tubular apparatus of claim 16, wherein the ultrasound unit includes at least one ultrasonic transducer.

28. The endotracheal tubular apparatus of claim 27, further comprising an ultrasonic monitor capable of ultrasonically imaging the second inflatable member within the body.

29. The endotracheal tubular apparatus of claim 28, wherein said ultrasonic monitor is adapted to ultrasonically image fluid flow within the second inflatable member using Doppler imaging.

30. An endotracheal tubular apparatus insertable within the body, comprising:

a tubular member having a proximal section, a distal section, and a ventilation lumen therethrough;

at least one inflatable member coupled to the distal section of the tubular member, said at least inflatable member being in fluid communication with a fluid source containing an acoustically transmissive material; and

an extracorporeal ultrasound unit for ultrasonically placing and monitoring the tubular apparatus within the body, said ultrasound unit including at least one ultrasonic transducer configured to direct an ultrasonic beam through the skin and into said at least one inflatable member.

31. A method of ultrasonically placing and monitoring an endotracheal tubular apparatus within a patient's airway, comprising the steps of:

providing at least one ultrasonic transducer on the anterior surface of the patient's neck;

providing an endotracheal tubular apparatus including a ventilation lumen, a main balloon cuff in fluid communication with a first external fluid source, and a leader balloon cuff in fluid communication with a second external fluid source;

inserting at least a portion of the tubular apparatus into the patient's oral or nasal cavity and advancing the tubular apparatus to a position at or near the patient's epiglottis;

inflating the leader balloon cuff with an acoustically transmissive material, causing the leader balloon cuff to expand against the anterior portion of the patient's larynx/pharynx;

ultrasonically determining the position of the tubular apparatus within the body;

advancing the tubular apparatus to a position within the trachea; and
expanding the main balloon cuff to provide an air seal within the trachea.

32. The method of claim 31, further comprising the step of ultrasonically imaging the patient's airway prior to the step of inserting the tubular apparatus into the body.

33. The method of claim 31, further comprising the step of ultrasonically confirming the position of the tubular apparatus at or near the vocal folds prior to said step of advancing the tubular apparatus to a position at or near the patient's epiglottis.

34. The method of claim 31, wherein the step of ultrasonically determining the position of the tubular apparatus within the body comprises the steps of:

directing an ultrasonic beam through the surface of the skin and into the leader balloon cuff; and

viewing the resulting image on an ultrasonic monitor.

35. The method of claim 34, wherein the ultrasonic beam is passed through the patient's middle cricothyroid ligament.

36. The method of claim 34, wherein the ultrasonic monitor is adapted to ultrasonically image fluid flow within the leader balloon cuff using Doppler imaging.

37. The method of claim 31, further comprising the step of ultrasonically confirming proper placement of the tubular apparatus within the trachea after said step of advancing the tubular apparatus to a position within the trachea.

38. The method of claim 37, wherein said step of ultrasonically confirming proper placement of the tubular apparatus comprises the steps of:

periodically injecting the leader balloon cuff with the acoustically transmissive material, causing the leader balloon cuff to expand against the anterior portion of the patient's trachea; and

ultrasonically imaging the location of the tubular apparatus within the trachea.

39. The method of claim 31, further comprising the steps of ventilating the patient using an external ventilating unit operatively coupled to the ventilation lumen.

40. A method of ultrasonically placing and monitoring an endotracheal tubular apparatus within a patient's airway, comprising the steps of:

providing at least one ultrasonic transducer on the anterior surface of the patient's neck;

providing an endotracheal tubular apparatus including a ventilation lumen, a main balloon cuff in fluid communication with a first external fluid source, and a leader balloon cuff in fluid communication with a second external fluid source;

inserting at least a portion of the tubular apparatus into the patient's oral or nasal cavity and advancing the tubular apparatus to a position at or near the patient's epiglottis;

inflating the leader balloon cuff with an acoustically transmissive material, causing the leader balloon cuff to expand against the anterior portion of the patient's larynx/pharynx;

ultrasonically imaging the location of the tubular apparatus within the body;

advancing the tubular apparatus to a position within the trachea;

expanding the main balloon cuff to provide an air seal within the trachea; and

periodically inflating the leader balloon cuff with the acoustically transmissive material to ultrasonically confirm proper placement of the tubular apparatus within the trachea.

41. The method of claim 40, further comprising the step of ultrasonically imaging the patient's airway prior to the step of inserting the tubular apparatus into the body.

42. The method of claim 40, further comprising the step of ultrasonically confirming the position of the tubular apparatus at or near the vocal folds prior to said step of advancing the tubular apparatus to a position at or near the patient's epiglottis.

43. The method of claim 40, wherein the step of ultrasonically imaging the location of the tubular apparatus within the body comprises the steps of:

directing an ultrasonic beam through the surface of the skin and into the leader balloon cuff; and

viewing the resulting image on an ultrasonic monitor.

44. The method of claim 43, wherein the ultrasonic beam is passed through the patient's middle cricothyroid ligament.

45. The method of claim 43, wherein the ultrasonic monitor is adapted to ultrasonically image fluid flow within the leader balloon cuff using Doppler imaging.

46. The method of claim 40, further comprising the steps of ventilating the patient using an external ventilating unit operatively coupled to the ventilation lumen.

47. A method of ultrasonically placing and monitoring an endotracheal tubular apparatus within a patient's airway, comprising the steps of:

providing at least one ultrasonic transducer on the anterior surface of the patient's neck;

providing an endotracheal tubular apparatus including a ventilation lumen, a main balloon cuff in fluid communication with a first external fluid source, and a leader balloon cuff in fluid communication with a second external fluid source;

inserting at least a portion of the tubular apparatus into the patient's oral or nasal cavity;

advancing the tubular apparatus to a first position at or near the patient's vocal folds;

inflating the leader balloon cuff with an acoustically transmissive material and ultrasonically confirm placement of the tubular apparatus at or near the vocal folds;

advancing the tubular apparatus to a second position at or near the patient's epiglottis;

inflating the leader balloon cuff with an acoustically transmissive material and ultrasonically confirm placement of the tubular apparatus at or near the epiglottis;

advancing the tubular apparatus to a third position within the trachea; and

inflating the leader balloon cuff with an acoustically transmissive material and ultrasonically confirm placement of the tubular apparatus within the trachea.

48. A method of ultrasonically placing and monitoring a tubular member within a patient's body, comprising the steps of:

providing at least one ultrasonic transducer located outside of the patient's body;

providing a tubular member having a proximal section, a distal section, and at least one inflation member operatively coupled to the distal section, said at least one inflation member being in fluid communication with a fluid source containing an acoustically transmissive material;

inserting the distal section of the tubular member into a hollow body cavity or conduit;

inflating said at least one inflatable member with the acoustically transmissive material; and

ultrasonically imaging the location of the tubular member within the body.